

CLAIMS

Amend the claims as follows.

1-56. (Cancelled)

57. (New) A network processing device, comprising:
circuitry configured to decrement time to live values of received traffic prior to routing the traffic;
the circuitry configured to analyze the time to live values to identify those time to live values that are decremented below a predefined threshold;
if one of the decremented values are identified as being below the predefined threshold, the circuitry configured to extract from a corresponding packet of the traffic a timestamp inserted by the source endpoint, wherein the timestamp indicates when the corresponding packet was transmitted from the source endpoint;
the circuitry configured to identify a receipt time for the corresponding packet, the receipt time indicating when the corresponding packet was received at the network processing device;
the circuitry configured to determine a difference between the extracted timestamp and the identified receipt time; and
the circuitry configured to piggyback the determined difference in an unused field of a packet expiration notice that is generated for expired packets, the packet expiration notice corresponding to the expired packet, wherein the network processing device utilizes the packet expiration notice for communicating the determined difference back to an originating source of the corresponding packet.

58. (New) The network processing device of claim 57, wherein the receipt time is generated using a same reference clock used to generate the inserted timestamp.

59. (New) The network processing device of claim 57, wherein the circuitry is further configured to:

identify a predefined portion of the corresponding packet as containing trace route information;

extract the trace route information from the identified packet portion; and

append the extracted trace route information to the packet expiration notice to allow the source endpoint to correlate the determined difference with the corresponding packet.

60. (New) The network processing device of claim 57, wherein the unused field is at least one selected from the group including a Destination Unreachable Message field, a Time Exceeded Message field, and a Source Quench Message field.

61. (New) The network processing device of claim of claim 57, wherein the circuitry is further configured to:

generate a reporting packet that is different than the packet expiration notice, the reporting packet containing the determined difference; and

transmit the reporting packet to an endpoint other than the source endpoint.

62. (New) A network processing device, comprising:

circuitry configured to decrement time to live values of received traffic prior to routing the traffic;

the circuitry configured to analyze the time to live values to identify those time to live values that are decremented below a predefined threshold;

if one of the decremented values are identified as being below the predefined threshold, the circuitry configured to identify a receipt time for a corresponding packet from the received traffic; and

the circuitry configured to piggyback the identified receipt time in an unused field of a packet expiration notice that is generated for expired packets, the packet expiration notice corresponding to the expired packet, wherein the network processing device utilizes the packet expiration notice for communicating the identified receipt time back to an originating source of the corresponding packet.

63. (New) The network processing device of claim 62, wherein the circuitry is further configured to:

identify a predefined portion of the corresponding packet as containing trace route information;

extract the trace route information from the identified packet portion; and

append the extracted trace route information to the packet expiration notice to allow the source endpoint to correlate the identified receipt time with the corresponding packet.

64. (New) The network processing device of claim 62, wherein the unused field is at least one selected from the group including a Destination Unreachable Message field, a Time Exceeded Message field, and a Source Quench Message field.

65. (New) The network processing device of claim of claim 62, wherein the circuitry is further configured to:

generate a reporting packet that is different than the packet expiration notice, the reporting packet containing the identified receipt time; and

transmit the reporting packet to an endpoint other than the source endpoint.

66. (New) An apparatus, comprising:

circuitry configured to generate packets having monotonically increasing values to trace a route through a network;

the circuitry configured to insert into each of the packets timestamps indicating a corresponding transmission time, and to transmit the packets having the timestamps;

the circuitry configured to receive back a packet expiration notice, wherein the packet expiration notice contains appended thereto a portion of data copied from a corresponding one of the transmitted packets, and the circuitry is configured to correlate the packet expiration notice to one of the transmitted packets according to the copied data; and

the circuitry configured to extract a determined time difference from the packet expiration notice, the determined time difference based on one of the timestamps, wherein the determined difference represents a one way trip time used by the correlated transmitted packet to travel from the apparatus to an intermediary node that generated the packet expiration notice.

67. (New) The apparatus of claim 66, wherein the circuitry is further configured to extract the determined time difference from a predefined field of the packet expiration notice, wherein the predefined field is at least one selected from the group including a Destination Unreachable Message field, a Time Exceeded Message field, and a Source Quench Message field.

68. (New) An apparatus, comprising:

circuitry configured to generate packets having monotonically increasing values to trace a route through a network, to address the packets to a common destination, and to transmit the generated packets;

the circuitry configured to locally store information indicating a time that each packet is transmitted, wherein the locally stored information is generated using a time reference;

the circuitry configured to receive back a packet expiration notice, wherein the packet expiration notice contains appended thereto a portion of data copied from a corresponding one of the transmitted packets, and the circuitry is configured to correlate the packet expiration notice to one of the locally stored transmission time information according to the appended data; and

the circuitry configured to extract a receive time value from the packet expiration notice, wherein the receive time value is generated using the same time reference used to generate the locally stored information, wherein the receive time value indicates a time that an intermediary node received a corresponding one of the packets relative to the correlated transmission time information.

69. (New) The apparatus of claim 68, wherein the circuitry is configured to determine a difference between the extracted receive time value and the correlated transmission time information to identify a one way travel time for the corresponding packet to travel from the apparatus to the intermediary node.

70. (New) The apparatus of claim 69, wherein the circuitry is further configured to upload the determined time difference to a remote device.

71. (New) The apparatus of claim 70, wherein the circuitry is further configured to extract receive time value from a predefined field of the packet expiration notice, wherein the predefined field is at least one selected from the group including a Destination Unreachable Message field, a Time Exceeded Message field, and a Source Quench Message field.

72. (New) A network processing device, comprising:

circuitry configured to decrement time to live values of received traffic prior to routing the traffic;

the circuitry configured to analyze the time to live values to identify those time to live values that are decremented below a predefined threshold;

if one of the decremented values are identified as being below the predefined threshold, the circuitry configured to identify a receipt time for a corresponding packet from the received traffic; and

the circuitry configured to piggyback time information in a packet expiration notice that is generated for expired packets, the packet expiration notice corresponding to the expired packet, wherein the network processing device utilizes the packet expiration notice for communicating the time information back to an originating source of the corresponding packet.

73. (New) The network processing device of claim 72, wherein the time information is at least one selected from the group including a receipt time of the corresponding packet and a calculated one way travel time that is based on the receipt time.

74. (New) The network processing device of claim 72, wherein the time information is inserted into a predefined field, wherein the predefined field is at least one selected from the group including a Destination Unreachable Message field, a Time Exceeded Message field, and a Source Quench Message field.

75. (New) The network processing device of claim of claim 72, wherein the circuitry is further configured to:

generate a reporting packet that is different than the packet expiration notice, the reporting packet containing the time information; and

transmit the reporting packet to an endpoint other than the source endpoint.